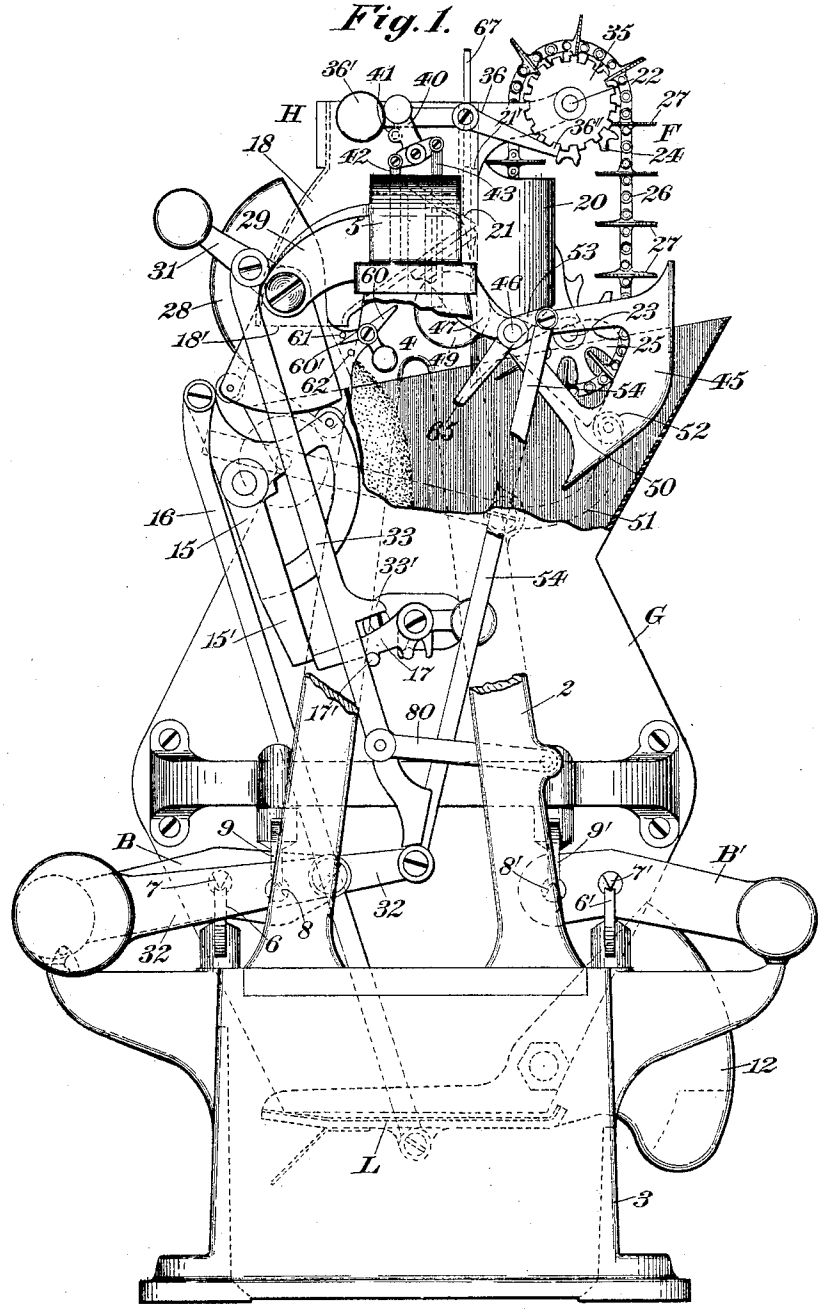
(No Model.) 4 Sheets—Sheet 1.

F. H. RICHARDS.

WEIGHING MACHINE.

No. 570,297. Patented Oct. 27, 1896.

Fig. 1.



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Inventor:
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(No Model.) 4 Sheets—Sheet 2

F. H. RICHARDS.

WEIGHING MACHINE.

No. 570,297. Patented Oct. 27, 1896.

Fig. 2.

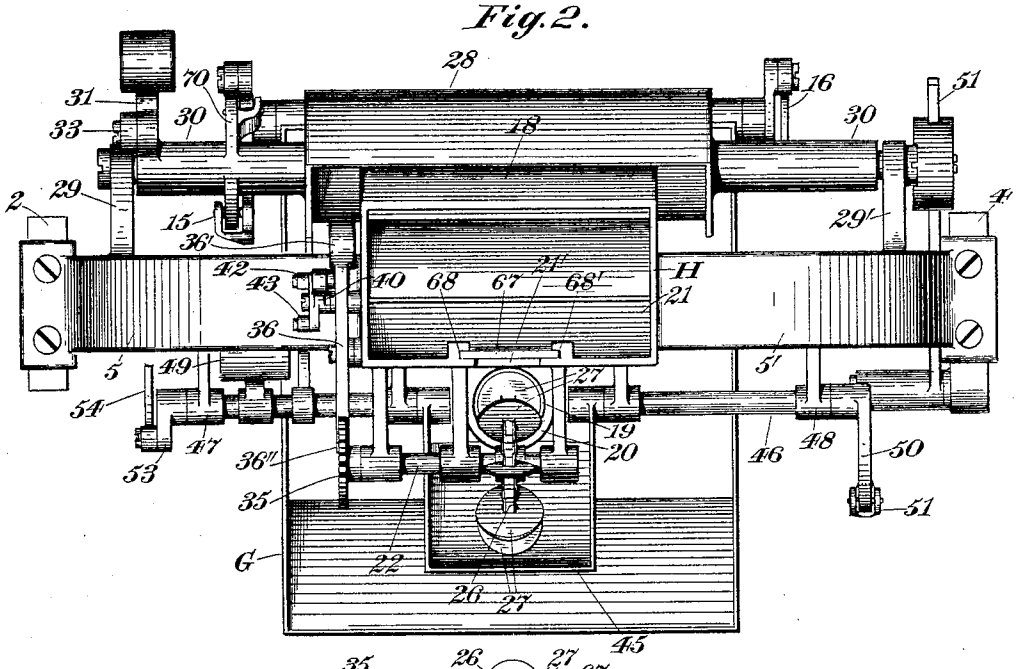
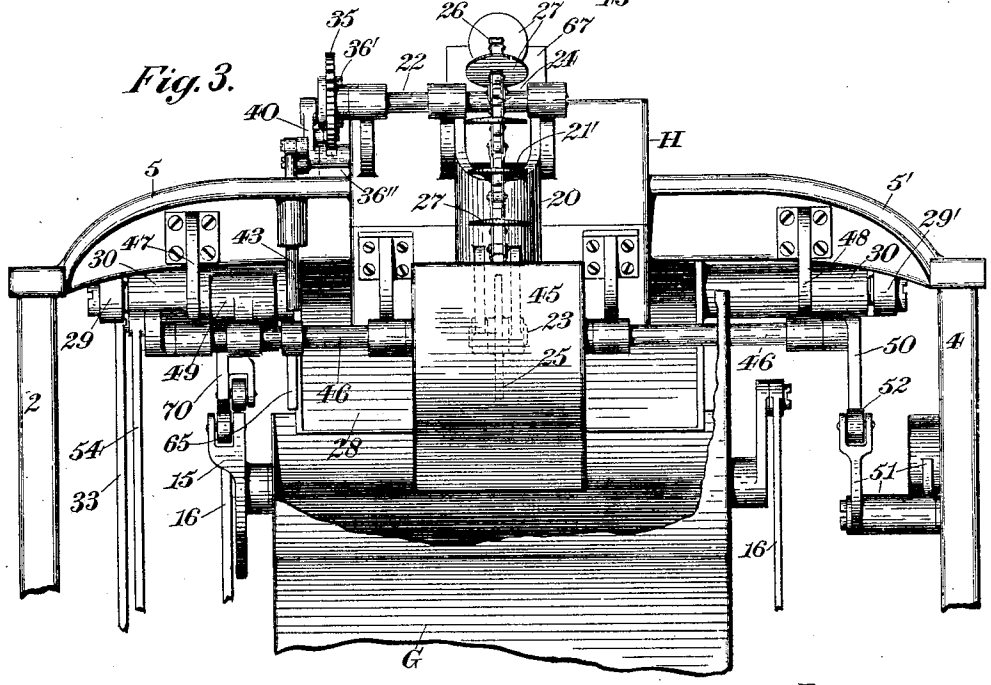


Fig. 3.



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(No Model.) 4 Sheets—Sheet 3.

F. H. RICHARDS.

WEIGHING MACHINE.

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Fig. 5.

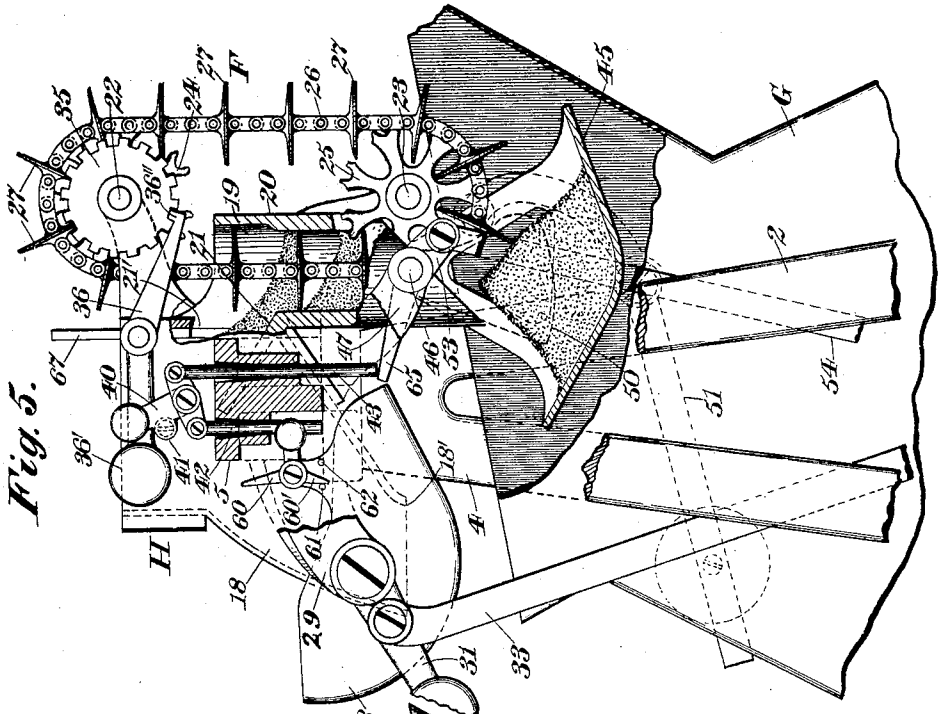
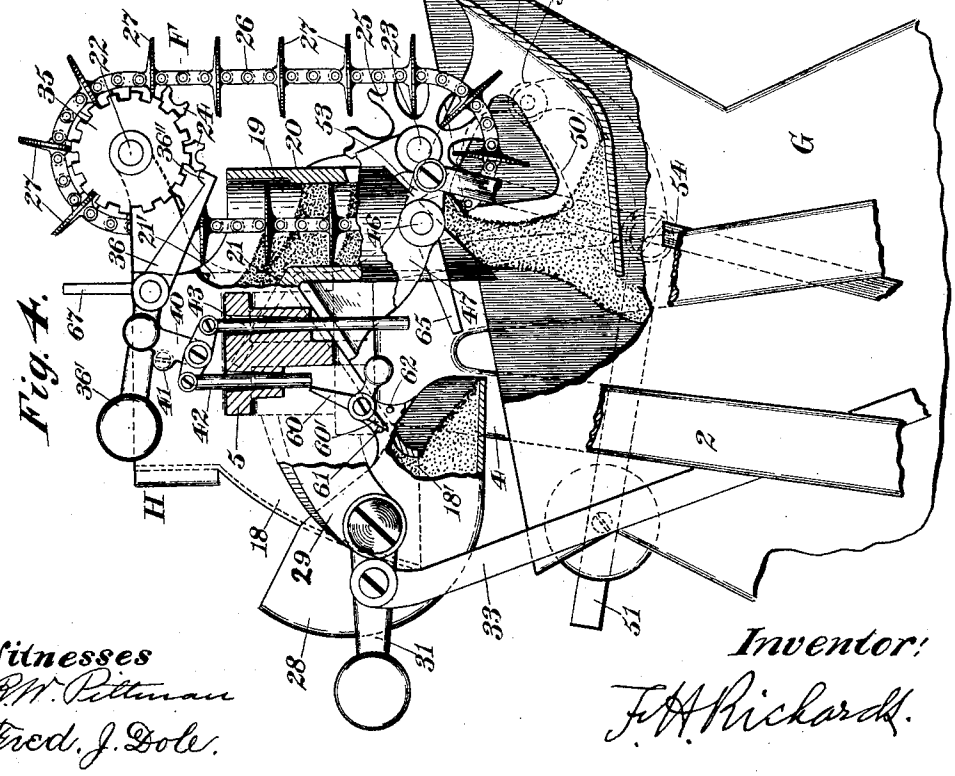


Fig. 4.



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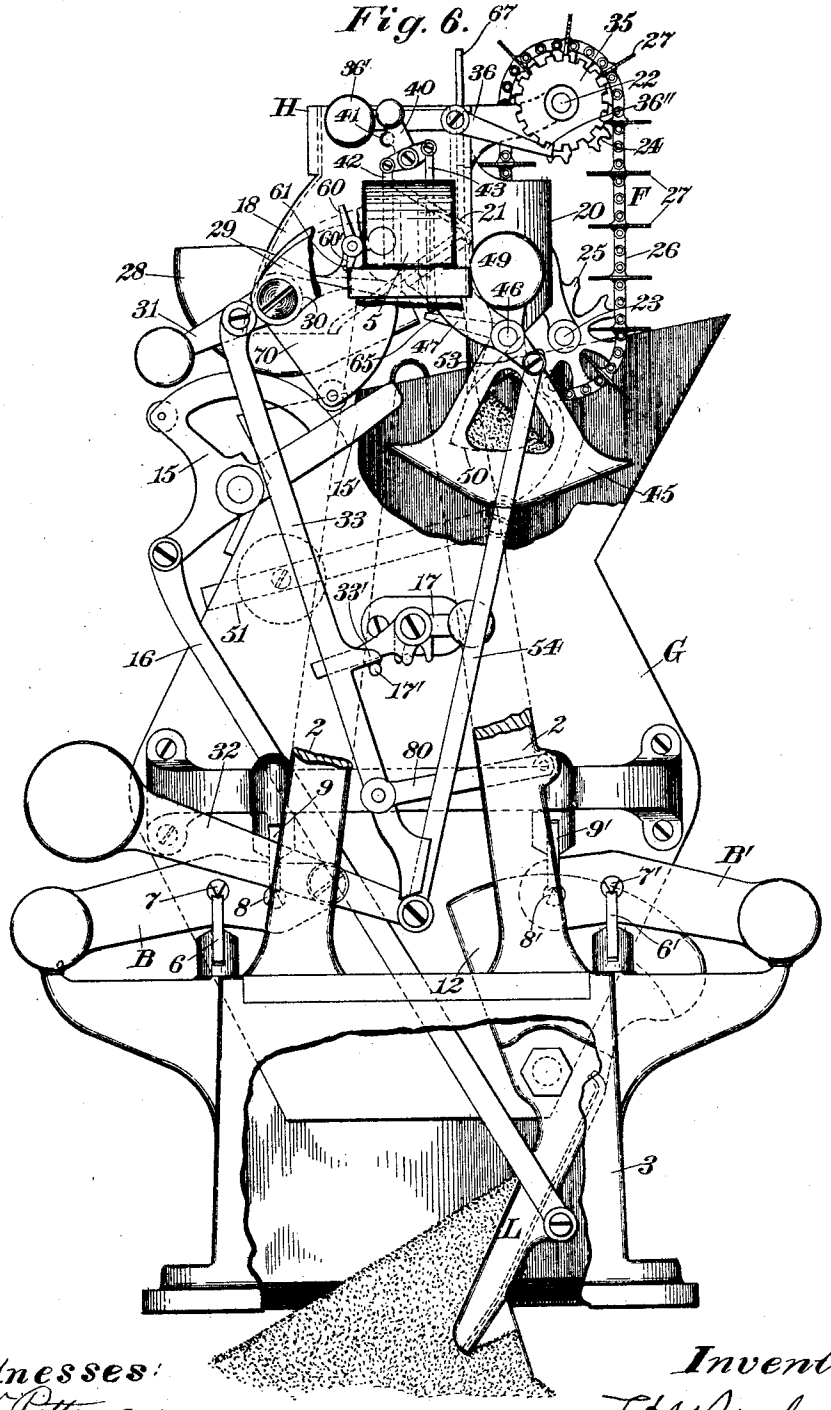
(No Model.) 4 Sheets—Sheet 4.

F. H. RICHARDS.

WEIGHING MACHINE.

No. 570,297. Patented Oct. 27, 1896.

Fig. 6.



Witnesses:
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Inventor:
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UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF HARTFORD, CONNECTICUT.

WEIGHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 570,297, dated October 27, 1896.

Application filed June 13, 1896. Serial No. 595,381. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Weighing-Machines, of which the following is a specification.

This invention relates to weighing-machines, an object of the invention being to provide an improved organization of mechanism comprising a chute and a feeder or conveyer located adjacent thereto, said feeder or conveyer being driven by a body of material passing through said chute, my present improvements being applicable to machines for weighing substances of different classes, but more especially those of a slow-running nature; and a further object of the invention is to provide valve mechanism and adjunctive devices coöperative therewith for controlling the passage of material to the bucket of the machine.

In the drawings accompanying and forming part of this specification, Figure 1 is a right-hand end elevation of a weighing-machine comprehending my improvements in the preferred embodiment thereof, illustrating the positions assumed by the various parts at the commencement of operation. Fig. 2 is a plan view of the upper part of the machine, and Fig. 3 is a front elevation of the same. Figs. 4 and 5 are end elevations, as seen from the left in Fig. 3, the working parts being shown in the positions occupied thereby at the commencement and close of the poising period, respectively. Fig. 6 is a view similar to Fig. 1, showing the bucket discharging a load.

Similar characters designate like parts in all the figures of the drawings.

The framework for supporting the operative parts of the weighing mechanism may be of any suitable character, and it is herein illustrated comprising the side frames or columns 2 and 4, mounted upon the chambered supporting-base 3, into which the bucket loads of material are intermittently discharged.

The supply apparatus comprises as one of its constituent elements a chute or hopper H, which is adapted to contain the mass of material to be weighed for delivery to the bucket or load-carrying receptacle of the machine, and said hopper is shown having formed integral therewith the laterally-extending brackets 5 and 5′, which are respectively attached by suitable fastening means to the side frames 2 and 4.

The bucket is designated by G and is of the well-known "single-chambered" type, it being widened at the top for a purpose that will hereinafter appear.

As a means for supporting the bucket, I have herein illustrated beam mechanism of the "duplex" type, although it is obvious that the bucket may be otherwise suspended, and said beam mechanism is illustrated consisting of the oppositely-disposed counterweighted scale-beams B and B′.

As a means for supporting the beam mechanism, the devices illustrated may be employed, the latter consisting of V-shaped bearings 6 and 6′, respectively, mounted on the base 3, it being understood that four of such supports will be furnished, the arms of the scale-beams being equipped with pivots or knife-edges 7 and 7′, respectively, resting on said beam-support. The beam-arms will also be provided with bucket-supports, two of these being shown as pivots or knife-edges 8 and 8′, against which bearings 9 and 9′, respectively, connected to the bucket G, are adapted to work.

The closer for the bucket is designated by L, and preferably consists of a flat plate fitting tightly against the lower edge of the bucket when in its normal position, as indicated in Fig. 1, and pivotally supported adjacent to the discharge-outlet thereof. Said closer may have counterweighted arms or blades 12, formed in one piece therewith, the purpose of said blades being to return the closer to its normal position on the discharge of the bucket load. It is obvious, however, that other means may be employed for this purpose.

As a means for holding the closer L against opening movement, the following-described instrumentalities, embodying a suitable latch, may be employed: A rocker is shown at 15 pivotally supported near the upper edge of the bucket and at one side thereof, said rocker constituting one member of a toggle, the other member thereof being the connect-

ing-rod 16, pivotally attached to said rocker and also to the closer L, and in such a manner that when the latter is in its shut or normal position the three toggle-pivots will be virtually in line, the upper pivot of the rod 16 being situated above the rocker-pivot, so that the rocker 15, when engaged by a suitable restraining device, may be held against movement by a slight exertion of power. For thus maintaining the rocker against movement a counterweighted latch is illustrated at 17, it being adapted to engage said rocker or the arm 15′ thereof when the parts are in the normal positions indicated in Fig. 1. In the embodiment illustrated the latch 17 swings upward to engage the rocker, and it will be evident that it may be released therefrom by downward pressure, the means for accomplishing this purpose being hereinafter described.

My invention contemplates the employment in connection with a chute of a feeder located adjacent to and driven by a body of material passing through said chute, the result being a great reduction in the power necessary to maintain the machine in operation, and therefore a material saving in running expenses. In the form herein illustrated the feeder will be utilized for furnishing the drip-stream necessary in a practically-operating machine to complete the bucket load, a power-operated drip-supply device usually being employed in connection with machines for weighing materials possessing certain peculiarities.

The chute or hopper H is shown having the spout 18 communicating with the interior thereof and terminating in an opening or outlet 18′, the said spout serving as a means for directing a gravitating stream of material to the bucket, such stream constituting the main stream and furnishing the major part of a bucket load.

The chute H is shown having a drip or storage chamber 19, formed by the open-ended conduit 20, which may be a tube of cylindrical or other form.

An inclined stream-directing plate is shown at 21, (see Figs. 4 and 5,) leading from the interior of the chute or hopper H to the drip or storage chamber 19, over which a body of material is adapted to flow, the same passing through the drip-opening 21′, formed on the front wall of the chute H.

The feeder or conveyer F is operable as an effective medium for supplying the drip stream on the cut-off of the main stream and to complete the partial bucket load, and is bodily movable through the drip-conduit 20 at the proper period in the operation of the machine, being preferably limited in its action by suitable means during the greater portion of the loading period or while the main stream is flowing into the bucket.

The drip-feeder F is shown as being of the "endless-conveyer" type, and, as before stated, has a movement through the drip-conduit during a certain period in the operation of the machine, it being forcibly actuated or operated by the impact against its floats or vanes of a body or stream of material flowing through the drip-opening 21 in the front wall of the chute. By the employment of this device, should the material tend to block or clog in the conduit 20, the weight thereof acting against the vanes of the feeder will forcibly operate said feeder to clear the conduit of such material.

The chute H is shown supporting the conveyer-shafts 22 and 23, journaled in brackets thereon, said shafts having keyed or otherwise fixed thereto the sprocket-wheels 24 and 25, about which is loosely passed the sprocket-chain 26, these parts being of any suitable or preferred type.

The vanes or float 27 on the feeder F are approximately flat disks, preferably equaling in area the bore of the drip-conduit 20, through which they pass, or they may be of any preferred shape, and also connected to the sprocket-chain 26 at suitable intervals.

For controlling the main stream of material which flows from the spout 18 of the chute H a main valve 28, of the "scoop" type, is herein illustrated, said valve having an oscillating movement beneath the mouth of the spout to either cut off or permit the flow of the main stream therefrom. The valve 28 is pivotally suspended between the arms 29 and 29′, projecting rearward from the brackets 5 and 5′, respectively, a two-part rock-shaft 30 constituting a convenient means for supporting the valve. The valve 28 is illustrated in its full open position in Fig. 1, so that the full volume of the main stream may flow from the spout 18, being directed by said valve into the bucket G.

For effecting an upward oscillation or cut-off movement of the valve 28 a counterweighted arm 31 is illustrated projecting rearward from the valve-supporting shaft 30, the normal tendency of this counterweighted arm being to effect a closing of the valve, this action, however, being suitably limited or checked.

For opening the valve the following-described mechanism may be employed: The scale-beam B is shown having pivoted thereto adjacent to its inner end the counterweighted lever 32, constituting a valve-opening actuator. A relatively long rod is shown at 33 operatively connected with the valve 28, it being pivoted to the counterweighted arm 31, said rod being also connected by a link 80, or otherwise, with a fixed part of the machine and being in engagement with the counterweighted lever 32. The counterweight of the lever 32 will normally exert its force on the counterpoised side of the scale-beam B, suitable stops being employed for maintaining the same in such relation, so that it becomes in effect a fixed extension of said scale-beam, being descendible therewith, whereby on the downward movement of the latter during the

loading period such lever constitutes a means for checking the closing movement of the valve 28 by its counterweighted arm 31.

At a predetermined point in the operation of the machine the lever 32 is shifted about its axis, as illustrated in Fig. 6, and on the return stroke thereof to its normal position, as shown in Fig. 1, an upward thrust will be imparted to the rod 33 and communicated to the valve 28 to open the same.

The tendency of the body of material which passes from the interior of the chute over the stream-directing plate 21 and into the chamber 19 is to force the individual feeder floats or vanes 27 downward by impact thereagainst when these are on the inner run thereof; but suitable detent means will preferably be employed for arresting such action during the major portion of the loading period, and the instrumentalities herein shown for this purpose will now be described. The feeder-supporting shaft 22, to which reference has been made, is shown extended and carrying at its outer end the notched or toothed stop-wheel 35, which may be splined or otherwise attached to said shaft. A detent or restraining device for the feeder is shown at 36, consisting in the present instance of a counterweighted lever pivotally supported on one of the end walls of the chute H, the tooth-shaped end 36″ of said lever being adapted to be thrust between the notches or serrations of the stop-wheel 35 by the force of the counterweight 36′ thereof, whereby the feeder F may be positively held against movement while such relation continues.

It will be obvious that when the end 36″ of the detent 36 is forced out of the notches of the stop-wheel 35 and past the plane of the periphery thereof the latter is free to turn, whereby the feeder may be forcibly actuated by the mass of material in said chute, the latter being fed downward by said feeder F from the drip-chamber 19 and into the bucket G. As the feeder floats or vanes pass out of the conduit 20, and as they approach the outer run thereof, they will assume at first an angular position and then a vertical, so that the material thereon may be positively dropped therefrom.

A detent-actuator is shown at 40 consisting of a compound or two-armed lever pivotally supported on the chute H, said lever being also counterweighted, the object of the counterweight being to maintain the lever against movement when in its normal position. The counterweighted arm of said lever is shown having fixed thereto the projection or stud 41, which has a movement into engagement with the counterweighted arm of the detent device 36 on the working stroke of said lever. It will be evident that on the continuation of such movement the counterweighted arm of the detent 36 will be raised, the non-counterweighted arm thereof being oppositely moved, whereby it is forced out of engagement with the stop-wheel 35, so that the feeder F will be thereby freed of all restraint and may be driven by the descending body of material within the chute H in the manner previously described. The oppositely-extending arms of the compound lever 40 are shown having loosely suspended therefrom the operating-rods 42 and 43, which pass through suitable guide bores or apertures formed in the bracket 5, said rods being pivoted to said lever-arms.

The action of the feeder will preferably be controlled from some reciprocatory member of the weighing mechanism—as, for example, from the valve 28—whereby the oscillation of the lever 40 may be effected at a predetermined point in the movement of said valve to thereby start the feeder F, as will hereinafter appear.

A drip or drizzle valve is shown at 45, it being substantially "pan-shaped" and pivotally supported for oscillation beneath the outlet of the drip-chamber 19, whereby it is adapted on its closing movement to cut off the drip and catch the drizzle from the feeder F on the completion of the bucket load. The valve 45 is shown hung from the rock-shaft 46, the ends of which are journaled in brackets 47 and 48, attached to the parts 5 and 5′ of the frame of the machine, said valve being also balanced, so that it has in itself no tendency to move in either direction when in its closed position, as indicated in Fig. 6, the balance-weight 49, suitably attached to the shaft 46, being employed for this purpose.

As a means for actuating the valve 45 to close the same, the mechanism disclosed in Letters Patent No. 548,843, granted to me October 29, 1895, may be employed, and, being shown, will now be described. A valve-closing cam is shown at 50 in position to receive a thrust from a valve-closing actuator to be transmitted to the valve 45. The side frame 4 is shown pivotally supporting the valve-closing lever or actuator 51, the front arm of which is provided with an antifriction-roll 52, adapted to travel along the working face of the cam 50 on the descending movement of the counterweighted arm of said lever, whereby said valve will be closed. The following-described means may be employed for opening said valve: The shaft 46 is furnished with a relatively short arm 53, to which is pivoted the connecting-rod 54, the free end of the latter being in engagement with the counterweighted lever 32 on the scale-beam B, whereby the closing movement of said valve 45 by its actuator 51 will be checked or retarded, as in the case of the valve 28. When said lever 32 returns to its normal position in the manner previously described, an upward thrust will be transmitted to the connecting-rod 54 and communicated to the valve 45 to open the same and permit the supply of the drip-stream to the bucket at the proper period in the operation of the machine.

The valve 28 is shown carrying a by-pass device 60, the arc of movement of which is intersected by the depending rod 42, so that

when said rod is engaged by said by-pass device the result will be an oscillation of the compound lever 40 and the moving of the detent device 36 out of engagement with the stop-wheel 35, whereby the feeder F may be operated, as hereinbefore specified. The by-pass device 60 consists of an angle-lever, one of the arms of which is counterweighted, by which the projection 60′ thereof may be held against the projecting pin 61 on the valve 28, whereby when in such position the by-pass 60 constitutes in effect a fixed projection on the valve 28. When the valve 28 has cut off the main stream of material, the by-pass 60 will be moved into contact with the depending rod 42, which action will elevate the same and swing the lever 40 about its center of movement, so that the latter raises the counterweighted arm of the detent 36 through the intervention of the pin 41, forcing the non-counterweighted or free arm of said detent out of a notch of the stop-wheel 35, in which it may be seated, whereby the feeder F may be driven. On the opening movement of the valve 28 the upper arm of the by-pass device 60 will impinge against the rod 42 and the latter will simply rock said by-pass device ineffectively about its pivot, following which the projection 60′ will be forced into contact with the pin 61, a second pin 62 on said valve limiting the range of action of the by-pass device 60.

The drip-valve 45 is equipped with means for returning the compound lever to its normal position, whereby the pin 41 thereof may be moved from under the counterweighted arm of the detent device 36, the end 36″ of the latter being thereby forced between the teeth of the stop-wheel 35 for stopping the movement of the feeder F. The drip-valve-supporting shaft 46 is provided with the rigid arm 65, which on the cut-off movement of said valve is adapted to engage the depending rod 43, so that said rod may be thrust upward, which rocks the lever 40 and moves the pin 41 from under the detent device 36, whereby the latter is permitted to resume its normal position, the rod 42 being oppositely moved and into the plane of action of the by-pass 60.

It will be remembered that a latch 17 has been described normally operative for holding the closer L against opening movement by engaging the arm 15′ of the rocker 15. For tripping said latch 17, the rod 33 is shown having a projection 33′, which is adapted to be thrust into engagement with the pin 17′ on the latch 17 at a time near that of the final closing movement of the valve 28 and subsequent to the cut off of the drip-stream by the valve 45, so that said latch will be thereby depressed and the closer L freed of all restraint, whereby the latter may be instantly forced open by the pressure of the mass within the bucket.

The front wall of the chute H, it will be remembered, has been described having an opening 21′, through which the body of the material that is to compose the drip-stream may gravitate; and my present invention contemplates the provision of means for regulating the volume of the said body or flowing mass of material. The means herein shown for this purpose consists of a vertically-slidable gate 67, having a movement across the drip-opening 21′ and working in suitable guides, as 68 and 68′, and shown formed on the inner face of the front wall of said chute.

A pair of reciprocally effective stops are illustrated operative, respectively, with the valve and with the closer substantially in the manner disclosed in Letters Patent No. 548,840, granted to me October 29, 1895, to which reference may be had. The rocker 15 constitutes the closer-operative stop, and the coacting or valve-operative stop is designated by 70.

Briefly, the operation of the herein-described weighing-machine is as follows: Fig. 1 represents the positions occupied by the respective operative parts of the machine at the commencement of operation, the closer being shut and locked in such position by the latch 17, which is in engagement with the rocker-arm 15′, the valve 28 being open and the feeder F at rest. The valve being open, the main stream will flow from the chute H and will gravitate into the empty bucket. When a certain proportion of the load has been received by the bucket, it and the beam mechanism will descend, the counterweighted lever 32, descending in unison therewith and falling from under the rod 33, will permit the closing of the valve 28 by the counterweighted arm 31 thereof. When the valve 28 has cut off the stream of material flowing from the spout 18, the by-pass 60 will raise the rod 42, the latter oscillating the lever 40, the pin 41 of which moves the counterweighted arm of the detent device 36 upward and forces the end 36″ thereof from between the teeth of the stop-wheel 35, whereby the feeder F may be started by the impact of the body of material in the chute H against the vanes 27 of the feeder, the mass operating the feeder being subsequently conveyed into the bucket thereby, as indicated in Fig. 4. During this operation the valve 45 is being slowly closed by its actuating-lever 51, the latter subsequently cutting off said drip-stream, and the arm 65 thereof, being carried into engagement with the rod 43, will thrust the same upward and move the pin 41 from under the detent 36, the latter instantly resuming its normal position. During the final closing movement of the valve 28 the projection 33′ on the rod 33 will be forced into contact with the latch-pin 17′, thereby depressing the latch 17, which frees the closer L, so that it may be forced open by the weight of the bucket contents, the load being discharged into the chamber of the base 3, as indicated in Fig. 6.

Having described my invention, I claim—

1. The combination with weighing mechanism embodying a bucket, of a chute; of a

feeder driven by material passing through said chute and operable for supplying material to said bucket.

2. The combination with weighing mechanism embodying a bucket, of a chute having a drip-stream opening; and a feeder driven by material passing through said chute and operable for supplying material to the bucket.

3. The combination with weighing mechanism embodying a bucket, of a chute; a feeder driven by material passing through said chute and operable for supplying material to said bucket; and means for holding said feeder against movement.

4. The combination with weighing mechanism embodying a bucket, of a chute having a main-stream outlet; and a feeder driven by material passing through said chute and operable for supplying material to the bucket.

5. The combination with weighing mechanism embodying a bucket, of a chute having a main-stream outlet and a drip-opening; and a feeder located adjacent to said drip-opening and driven by material passing therethrough, said feeder being controlled by the weighing mechanism.

6. The combination with weighing mechanism embodying a bucket, of a chute; and a feeder bodily movable through said chute and driven by descending material within said chute and controlled by means operative with the weighing mechanism.

7. The combination with weighing mechanism embodying a bucket, of a chute having a main-stream outlet and a drip-chamber; and a feeder bodily movable through said chamber and operable for supplying material to said bucket.

8. The combination with weighing mechanism embodying a bucket, of a chute having a main-stream outlet and a drip-chamber; and a feeder bodily movable through said drip-chamber and driven by material descending therein, said feeder being operable for supplying material to the bucket.

9. The combination with a bucket, of a chute; a feeder located adjacent to, and driven by material passing through, said chute; and a cut-off valve.

10. The combination with weighing mechanism embodying a bucket, of a chute having a main-stream opening and provided also with a drip-opening, of a feeder located adjacent to said chute and driven by material passing through one of said openings, said feeder being also operable for supplying material to the bucket.

11. The combination with weighing mechanism embodying a bucket, of a chute having an opening; a feeder located adjacent to said chute and driven by material passing through said opening, said feeder being also operable for supplying material to said bucket; and means for regulating the volume of the material passing through said opening.

12. The combination with weighing mechanism, of a chute; a feeder located adjacent to said chute and driven by material passing therethrough; and means operative with said weighing mechanism for controlling the action of said feeder.

13. The combination with a chute having a main-stream outlet and a conduit, said chute also having an inclined plate leading therefrom to said conduit; of a feeder operable in said conduit and driven by material passing through said conduit.

14. The combination with weighing mechanism embodying a bucket, of a chute and a valve therefor; a feeder located adjacent to said chute and driven by material passing therethrough, said feeder being also operable for supplying such material to the bucket; and means operative with the valve for controlling the action of said feeder.

15. The combination with a chute having a main-stream outlet and provided also with a drip-opening, of a feeder located adjacent to said chute and driven by material passing through said chute and operable also for conveying the same therefrom; and a valve movable below said feeder.

16. The combination with weighing mechanism embodying a bucket, of a chute having a main-stream outlet and provided also with a drip-opening; a feeder operated by material passing through said chute and operable for supplying material to the bucket; and a gate slidable across said opening for regulating the volume of a stream of material flowing through said drip-opening.

17. The combination with a chute having a main-stream outlet and provided also with a drip-opening, of a valve operable for controlling the main stream; a feeder driven by material passing through said drip-opening; and a valve movable below said feeder.

18. The combination with a chute having a tubular conduit, of a feeder bodily movable through said conduit; and weighing mechanism controlling the action of said feeder and comprising a valve having a movement below said feeder.

19. The combination with weighing mechanism embodying a bucket, of a chute having a tubular conduit; a feeder comprising a chain having a series of floats, said feeder being driven by material passing through said conduit and controlled in its action by means operative with the weighing mechanism.

20. The combination with a chute, of a feeder; a detent for holding the same against movement; a lever for actuating said detent, said lever having a pair of depending rods; and means for operating said rods and thereby actuating the same.

21. The combination with a chute, of a feeder; a detent for holding said feeder against movement; an actuator for said detent; and a valve provided with a device for operating said actuator.

22. The combination with a chute, of a feeder; a detent for holding said feeder against movement; an actuator for said detent; and

a valve provided with a by-pass device for operating said actuator.

23. The combination with a chute, of a feeder; a counterweighted detent device for holding said feeder against movement; an actuator for said detent device; and a valve provided with a device for operating said actuator.

24. The combination with a chute, of a feeder; a detent device for holding said feeder against movement; a compound lever for actuating said detent device, said compound lever having a pair of depending rods; and weighing mechanism provided with means for operating said rods.

25. The combination with a chute, of a feeder; a detent device therefor; a compound lever for actuating said detent device, said lever having a pair of depending rods; and a pair of valves provided with means for operating said rods.

26. The combination with a chute, of a feeder consisting of an endless chain provided with a series of floats; supporting-shafts for said feeder, one of which is provided with a stop-wheel; a detent for engaging said stop-wheel; and weighing mechanism embodying means for throwing said detent into an inoperative position.

27. The combination with a chute, of a feeder consisting of an endless chain provided with a series of floats; supporting-shafts for said feeder, one of which is provided with a stop-wheel; a detent operative for engaging said stop-wheel; a compound lever for actuating said detent and furnished with a pair of depending rods; and a pair of valves provided with means for operating said rods.

28. The combination with a chute, of a chain-feeder; supporting-shafts for said feeder, one of which is provided with a stop-wheel; a detent for locking said stop-wheel; and means for actuating said detent.

29. The combination with a feeder operated by a stream of material, of a cut-off valve; a rod connected to said valve; and a shiftable lever also connected to said rod.

30. The combination with weighing mechanism and a bucket supported thereby, of a supply-chute; a feeder operated by material issuing from said chute; a cut-off valve; a rod connected to said valve; and means for actuating said rod.

31. In a weighing-machine, the combination with beam mechanism and with a bucket supported thereby, of a hopper having main and drip stream openings and valves for controlling the passage of material through said openings; of a drip-stream feeder actuated by material passing through the drip-opening; and mechanism actuated by one of the valves for controlling the action of said feeder.

32. The combination with weighing mechanism embodying a bucket, of a feeder driven by material delivered to said bucket and controlled by the weighing mechanism.

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